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SPICER LITE®
SERVICE MANUAL
SECTION 3
3264-SLSTRG
SEPTEMBER 1999

SPICER®

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INSPECTION

SPICER LITE® ALUMINUM STEERING SHAFT (INTERMEDIATE SHAFT) INSPECTION

Before You Get Started

This manual is intended to be a supplement to your original equipment vehicle manufacturers' service manual. For complete detailed Spicer aluminum steering shaft (intermediate shaft) maintenance procedures use this manual.

Note - Spicer Lite aluminum steering shafts (intermediate shafts) are found on vehicles throughout the world. This manual includes international terminology. The international terms have been highlighted in teal.

Caution - Under no circumstances should an individual attempt to perform aluminum steering shaft (intermediate shaft) service and/or maintenance procedures for which he or she has not been trained or does not have the proper tools and equipment. ▲ See warning, below.

▲ ***WARNING***

Failure to take common-sense, precautionary measures when working on a vehicle could result in property damage, personal injury or death. In order to avoid property damage, personal injury or death, you must:

1. **ALWAYS** wear safety glasses when performing maintenance or service. Failure to wear safety glasses could result in personal injury, partial or complete vision loss.

2. **NEVER** attempt to remove an aluminum steering shaft (intermediate shaft) from a vehicle while the engine is running. Be sure that the vehicle's engine is off, and keys are removed from ignition.

3. **NEVER** go under or work on a vehicle that is not on a level or flat surface.

4. **NEVER** remove an aluminum steering shaft (intermediate shaft) without blocking the vehicle's wheels.

5. **NEVER** heat an aluminum steering shaft (intermediate shaft) component or use a hammer on the aluminum components of the steering shaft to remove it from the vehicle.

6. **NEVER** stand on an aluminum steering shaft (intermediate shaft) or use it as a leverage bar. See notification decal (reproduced below) on aluminum steering shaft (intermediate shaft).

NOTICE/AVISO/AVIS

NO STEP **NO STEP** **NO STEP**
For Service and Safety requirements
see Spicer Service Manual 3264-SLSTRG or www.dana.com
NÃO PISAR **NÃO PISAR** **NÃO PISAR**
Para informações sobre manutenção e exigências de seguranca
Veja o Manual de Serviços Spicer 3264-SLSTRG ou www.dana.com
NO PISAR **NO PISAR** **NO PISAR**
Para informaciones de mantenimiento y requisitos de seguridad
Vea el Manual de Servicios Spicer 3264-SLSTRG o www.dana.com
NE PAS APPUYER **NE PAS APPUYER** **NE PAS APPUYER**
Vou les exigences d'entretien et de sécurité
Dans le manuel de service Spicer n° 3264-SLSTRG Ou: www.dana.com

7. **NEVER** make any modifications to an aluminum steering shaft (intermediate shaft) that were not original to the design of the product.

8. **NEVER USE** an aluminum steering shaft (intermediate shaft) in non-power steering applications.
▲ See warning, below.

▲ ***WARNING***

Spicer Lite aluminum steering shafts (intermediate shafts) are to be used only in original equipment vehicle manufacturers' applications. Failure to do so can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

9. **NEVER** use an aluminum steering shaft (intermediate shaft) in a cab over application. ▲ See warning, above.

10. **NEVER** use an aluminum steering shaft (intermediate shaft) in a power-take-off (PTO) application.

11. **NEVER** high-pressure wash aluminum steering shaft (intermediate shaft) u-joints or booted slip member with degreasing solvent or water.

12. **NEVER** replace only one component of the slip member assembly (yoke shaft or slip yoke).

ALUMINUM STEERING SHAFT (INTERMEDIATE SHAFT) INSPECTION PROCEDURES

Spicer Lite aluminum steering shafts (intermediate shafts) should be carefully inspected at recommended original equipment vehicle manufacturers' service intervals and/or at Spicer recommended lubrication intervals, as shown in table A, below. Be sure to follow **ALL** inspection procedures described in this manual.

Note - The following procedures are to be performed **prior to** any lubrication of the universal joints. The addition of lubricant can mask the looseness in a component that is beginning to show wear and may be in need of replacement.

Required Tool

- Spicer Steering Wear Indicator
  Part Number STWI-2 (See photo 1)
  1-800-826-HELP (U.S. only)
  (For proper tool usage instruction – refer to Appendix A.)

Photo 1

END FITTINGS PINCH BOLT STYLE

1. Check all input and output end fittings for looseness in the spline connection. Grasp the end fitting with both hands. Try to move it vertically and horizontally to feel any looseness. (See photo 2 below.) There should **NOT** be any movement in the end fittings relative to the input or output shaft to which they are connected.
   ▲ See warning, below.

▲ *WARNING*

Failure to replace damaged aluminum steering shaft (intermediate shaft) components can cause aluminum steering shaft (intermediate shaft) failure. Failure of an aluminum steering shaft (intermediate shaft) can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

If looseness is evident, replacement of the end fitting is necessary. For proper end fitting replacement procedures, refer to the removal and installation sections of this manual.

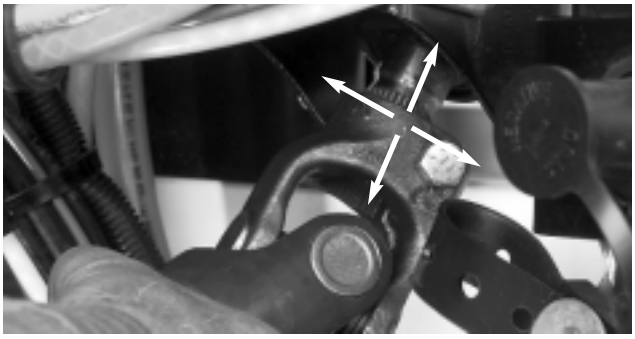

Photo 2

UNIVERSAL JOINT MAXIMUM LUBRICATION INTERVALS

SERIES	CITY	ON-HWY.	LINEHAUL	OFF-HWY.
SPL 6 (relubeable style)	25,000 Mi. 40,000 Km or 3 Months (whichever comes first)	50,000 Mi. 80,000 Km or 6 Months (whichever comes first)	50,000 Mi. 80,000 Km or 6 Months (whichever comes first)	25,000 Mi. 40,000 Km or 3 Months (whichever comes first)

City *is defined as all applications that require a minimum of 90% of operation time within city limits.*
On-highway *is defined as all applications requiring less than 10% of operating time on gravel, dirt or unpaved roads.*
Linehaul *is defined as 100% of operation time on smooth concrete or asphalt.*
Off-highway *is defined as all applications requiring more than 10% of operating time on gravel, dirt or unpaved roads.*

Table A

2. Visually inspect both end fittings of the steering shaft for looseness or a gap at the pinch bolts and/or nuts. Also check to be sure the pinch bolts and/or nuts are not missing. (See photo 3.) If any of these situations are evident, inspect the male splined shaft for wear or damage. (See photo 4.) If the male shaft splines are worn or damaged, both the male shaft and end fitting must be replaced. ⚠ See warning, below.

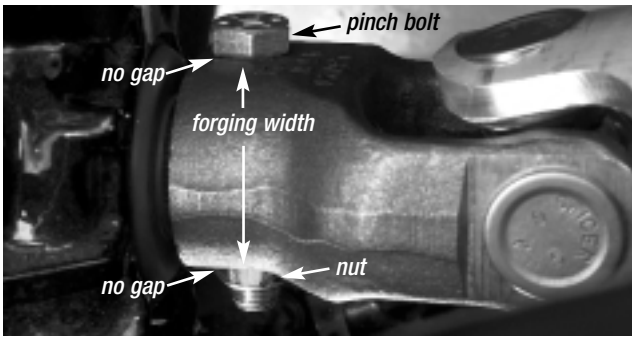

Photo 3

Photo 4

⚠ WARNING

Failure to replace damaged aluminum steering shaft (intermediate shaft) components can cause aluminum steering shaft (intermediate shaft) failure. Failure of an aluminum steering shaft (intermediate shaft) can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

For proper end fitting replacement procedures, refer to the removal and installation sections of this manual. For proper male splined shaft replacement procedures, replace in accordance with the original equipment vehicle manufacturers' replacement procedures.

3. If no looseness or damage is evident, re-torque pinch bolts to proper torque specifications. (See table B, below.)

⚠ WARNING

Failure to torque pinch bolts and/or nuts to required specifications can result in failure of the aluminum steering shaft (intermediate shaft). Failure of an aluminum steering shaft (intermediate shaft) can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

PINCH BOLT* AND/OR NUT TORQUE SPECIFICATIONS

KIT #	BOLT	BOLT LENGTH FOR BOLT	WRENCH SIZE FOR NUT	NUT	WRENCH SIZE	BOLT HOLE DIAMETER	DRY TORQUE NM	DRY TORQUE FT.LB.	FOR END YOKE WITH FORGING WIDTH OF***
211269X	included	2"	9/16"	included	9/16"	3/8"	30-35	40-48	1.500"
211270X	included	1.75"	9/16"	included	9/16"	3/8"	30-35	40-48	1.125" & 1.25"
211271X	included	2"	5/8"	included	11/16"	7/16"	46-55	63-75	1.500"
211272X	included	1.75"	5/8"	included	11/16"	7/16"	46-55	63-75	1.125" & 1.25"
211273X	included*†	1.25"	5/8"	not required	–	7/16" thread dia.	46-55	63-75	1.125" w/threads in yoke
211274X	included	2.125"	5/8"	included	11/16"	7/16"	46-55	63-75	1.620"

**Aluminum steering shaft (intermediate shaft) end fitting pinch bolts are to be S.A.E. grade eight. Nuts for pinch bolts are to be self-locking with a full nylon insert, serrated washer seat or upset threads. An S.A.E. grade five hex nut used in conjunction with a split lock washer is also acceptable. Do not use inferior grade bolts.*

**†Bolt must have self-locking feature.*

****See photo 3, above*

Note - *When specified, use the original equipment vehicular manufacturers' recommended pinch bolts and/or nuts. If no original equipment vehicle manufacturers' specification is given, use the Spicer recommended hardware. (See table B, above.)*

⚠ *See warning, above.*

Table B

END FITTINGS
COMPANION FLANGE/FLANGE YOKE STYLE

1. Check all input and output end fittings for looseness in the spline connection. Grasp the end fitting with both hands. Try to move it vertically and horizontally to feel any looseness. There should **NOT** be any movement in the end fittings relative to the input or output shaft to which they are connected. ▲ See warning, below.

▲ *WARNING*

Failure to replace damaged aluminum steering shaft (intermediate shaft) components can cause aluminum steering shaft (intermediate shaft) failure. Failure of an aluminum steering shaft (intermediate shaft) can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

2. Visually inspect all companion flange/flange yoke bolts and nuts (if applicable) for looseness, wear or damage. If bolts or nuts have looseness, wear or damage, replacement of the companion flange and flange yoke is necessary. ▲ See warning, above.

For proper replacement procedures for bolts, nuts, companion flange and flange yoke, refer to the removal and installation sections of this manual.

3. If no looseness or damage is evident, re-torque companion flange/flange yoke bolts and nuts (if applicable) to required specifications. (See table C, below.)

COMPANION FLANGE/FLANGE YOKE BOLT AND NUT TORQUE SPECIFICATIONS

WRENCH SIZE	DRY TORQUE NM	DRY TORQUE FT. LB.
1/2"	22-26	30-35

Table C

UNIVERSAL JOINTS

1. Using the STWI-2 dial indicator, mounted to aluminum steering shaft (intermediate shaft), check for excessive circumferential (backlash) looseness of the universal joint across the yoke lug ear span. (See photo 5 and Appendix.) Try to rotate the shaft back and forth to indicate any looseness. There should never be more than .011 in. (.28 mm) movement in the universal joint kit relative to the inboard and outboard yokes. If looseness is greater than stated above, replacement of the universal joint kit is necessary. ▲ See warning, step 1, left.

Photo 5

Refer to the removal and installation sections of this manual for proper universal joint kit replacement procedures.

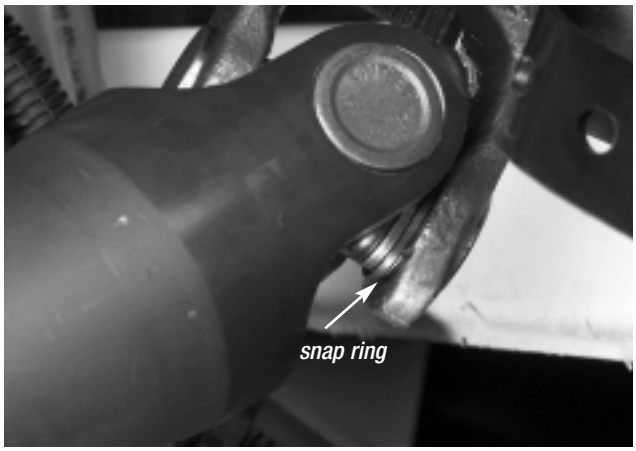

Photo 6

2. Visually check for damaged, severely corroded, or missing snap rings in both universal joint kits. (See photo 6.) If any snap rings are damaged, severely corroded or missing, replacement of the universal joint kit is necessary. ▲ See warning, below.

▲ *WARNING*

Failure to replace damaged aluminum steering shaft (intermediate shaft) components can cause aluminum steering shaft (intermediate shaft) failure. Failure of an aluminum steering shaft (intermediate shaft) can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

Refer to the removal and installation sections of this manual for proper universal joint kit replacement procedures.

3. Visually inspect all the universal joint kits for the presence of grease zerk (nipple) fittings (if applicable). Grease zerk (nipple) fittings should not be missing, loose or fractured. If the grease zerk (nipple) fitting is missing or fractured, the universal joint kit must be replaced. ▲ See warning, above.

Refer to the removal and installation sections of this manual for proper universal joint kit replacement procedures.

4. If the grease zerk (nipple) fitting is loose, tighten to snug. Continue to tighten until grease zerk (nipple) fitting is oriented for easy lubrication. Tighten to (31-55 in. lbs.) (1.9-3.4 Nm). (See table D, below.)

UNIVERSAL JOINT GREASE ZERK (NIPPLE) FITTING SPECIFICATIONS

SERIES	GREASE ZERK (NIPPLE) FITTING P/N	ZERK (NIPPLE) TORQUE NM	IN.LB.
SPL6	500175-2	1.9-3.4	31-55

Table D

SLIP MEMBER ASSEMBLY

1. Using the STWI-2 dial indicator, as illustrated, check the slip member assembly for excessive circumferential (backlash) looseness. (See photo 7.) Using both hands, one on each side of the gage, apply direct torque to the shaft by twisting the shaft in opposite directions as illustrated in photo 7, below. Total indicator travel should not exceed .040 in. (1.0 mm). If looseness, as read on dial indicator, is greater than stated above, replacement of the **complete** aluminum steering shaft (intermediate shaft) assembly is necessary. ▲ See warning, below.

▲ *WARNING*

Aluminum steering shaft (intermediate shaft) slip member components (yoke shaft and slip yoke) are matched sets. ***NEVER*** *replace only one component of the slip member assembly (yoke shaft or slip yoke). Replacing only one member of the slip member assembly can result in impaired steering and possible loss of vehicle control which can result in property damage, personal injury or death.*

Photo 7

Refer to the removal section of this manual for proper aluminum steering shaft (intermediate shaft) assembly replacement procedures.

2. Using the STWI-2 dial indicator, as illustrated, check the slip member assembly for excessive radial (broken back) looseness. (See photo 8.) Grasp the aluminum steering shaft (intermediate shaft) and apply a load of five pounds (2.27 kgs.) to the shaft and perpendicular to dial indicator face.Ⓣ Then apply a load of five pounds 180 degrees opposite to the shaft.

Ⓣ Tip

Loop a wire or plastic zip tie around the shaft, between the boot and the smaller clamp of STWI – 2 gage. Using a spring scale (e.g. fish scale) pull on loop to five pounds.

Total indicator travel should not exceed .060 in. (1.5 mm). If looseness, as read on dial indicator, is greater than stated above, replacement of the **complete** aluminum steering shaft (intermediate shaft) assembly is necessary. ▲ See warning, step 1.

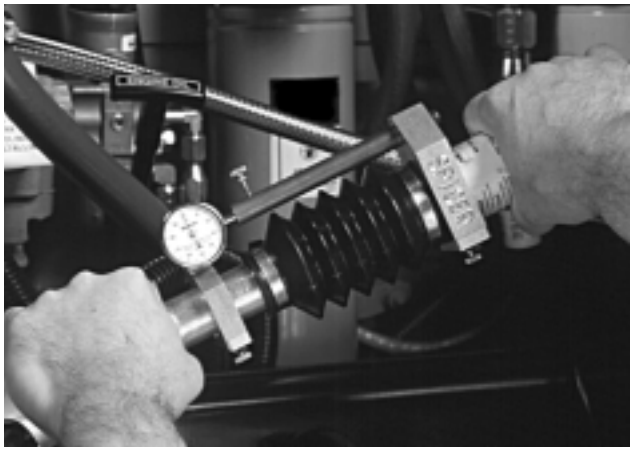

Photo 8

3. Check for damaged or missing boot and/or clamps. (See photo 9.) Make sure the boot is properly clamped and square to the shaft and no looseness or damage is apparent. Check to make sure boot clamps are properly seated. If any looseness or damage is evident or boot clamps are not properly seated, replacement of the slip member boot is necessary. ▲ See warning, below.

Refer to the removal and installation sections of this manual for proper slip member boot replacement procedures. ▲ See warning, below.

▲ *WARNING*

Failure to replace damaged aluminum steering shaft (intermediate shaft) components can cause aluminum steering shaft (intermediate shaft) failure. Failure of an aluminum steering shaft (intermediate shaft) can result in impaired steering and possible loss of vehicle control, which can result in property damage, personal injury or death.

4. Check to be sure the welch plug is not loose, missing or damaged. (See photo 10.) If the welch plug is loose, missing or damaged, replacement of the **complete** aluminum steering shaft (intermediate shaft) assembly is necessary. ▲ See warning, step 3.

5. Check the aluminum steering shaft (intermediate shaft) for dents in the aluminum and for damage to the lug ear shoulder. If either of these situations are evident, replacement of the **complete** aluminum steering shaft (intermediate shaft) assembly is necessary. ▲ See warning, step 3.

Refer to the removal and installation sections of this manual for proper aluminum steering shaft (intermediate shaft) assembly replacement procedures.

Photo 9

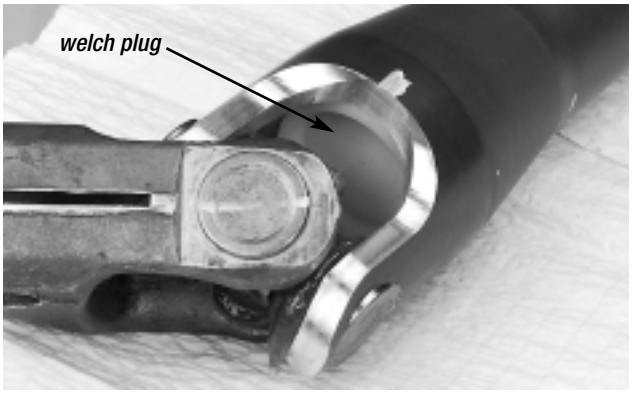

Photo 10